

## I CLAIM

1. A hubcap breather assembly for mounting in an access opening in a hubcap end wall to seal lubricated wheel bearings in an automotive vehicle comprising:

5 a resilient, annular collar having a radial exterior surface configured to fit within said access opening in fluid-tight sealed engagement therewith and a radial interior surface configured to form a filtration cartridge seat,

a filter cartridge cup having an open outboard mouth, an annular peripheral wall, and a transverse inboard floor with at least one breather port defined therethrough, and said filter cartridge cup is seated upon said filtration cartridge seat,

10 a filter cartridge lid having a transverse roof with at least one vent opening therein and a peripheral rim engaged in fluid-tight sealed relationship with said filter cartridge cup mouth to define a filter cartridge chamber within the confines of said filter cartridge cup and said filter cartridge lid, and

a hydrophobic, gas-permeable, particulate matter filter disposed within and extending entirely across said filter cartridge chamber.

2. A hubcap breather assembly according to Claim 1 further characterized in that said filter is comprised of a substance selected from the group consisting of: high density polyethylene, ultra high molecular weight polyethylene, polypropylene, polytetrafluoroethylene, nylon, polyvinylidene fluoride, and polyethersulfone.

3. A hubcap breather assembly according to Claim 1 wherein said filter is comprised of a sintered thermoset polymer.

4. A hubcap breather assembly according to Claim 1 wherein said filter is

comprised of a sintered thermoplastic polymer.

5. A hubcap breather assembly according to Claim 1 wherein said filter is comprised of a first porous layer for screening particulate matter and a second hydrophobic layer located inboard from said first porous layer for screening water.

6. A hubcap breather assembly according to Claim 5 wherein said first porous layer is comprised of sintered polypropylene plastic.

7. A hubcap breather assembly according to Claim 5 wherein said second hydrophobic layer is comprised of a sheet of polytetrafluoroethylene.

8. A hubcap breather assembly according to Claim 5 further comprised of a third porous layer for screening particulate matter located inboard from said second hydrophobic layer.

9. A hubcap breather assembly according to Claim 8 wherein said third porous layer is comprised of sintered polypropylene plastic.

10. A hubcap breather assembly according to Claim 1 wherein said floor of said filter cup is formed with a single, axially centered breather port as aforesaid.

11. A hubcap breather assembly according to Claim 10 wherein said roof is formed with a plurality of vent openings as aforesaid and a plenum cavity in communication with all of said vent openings is defined between said roof and said filter.

12. A hubcap breather assembly according to Claim 1 wherein said filter cartridge cup is formed with a plurality of mutually parallel positioning pins spaced about its mouth and extending in an outboard direction therefrom and said peripheral rim of said filter cartridge lid is formed with a plurality of mutually parallel sockets formed in said

5 peripheral rim and aligned with said positioning pins, and said positioning pins are frictionally engageable in said sockets.

13. A hubcap breather assembly according to Claim 12 wherein said roof of said filter cartridge lid has an underside and said filter cartridge lid is formed with a plurality of radially directed spacer ribs on said underside of said roof whereby said filter is held at a spaced distance from said underside of said roof to form a plenum cavity therebetween.

14. A hubcap breather assembly according to Claim 13 wherein said roof is formed with a plurality of vent openings as aforesaid and said plenum cavity is in communication with all of said vent openings.

15. A vented hubcap end closure device for sealing lubricated wheel bearings in an automotive vehicle wheel comprising:

5 a resilient, annular collar having a radial outer periphery configured for fluid-tight sealing engagement in a wheel bearing plug opening in an end wall of an automotive vehicle wheel hubcap and a radial inner wall configured to seat a filter unit, wherein said filter unit is comprised of:

a filter cartridge cup having a radial outer periphery seated against said inner wall of said collar, an outboard rim forming an open mouth, and a transverse inboard floor with at least one breather port defined therethrough,

10 a filter cartridge cap secured to said outboard rim of said filter cartridge cup in fluid-tight sealing engagement with said collar and having a transverse roof that defines a filter cartridge chamber located between said filter cartridge cup floor and said filter cartridge lid roof and said roof has at least one vent opening defined

therethrough, and

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a filtration device extending transversely and entirely across said filter cartridge chamber whereby said filtration device serves as a barrier to the passage of moisture and particulate matter between said at least one vent opening and said at least one breather port.

16. A vented hubcap end closure device according to Claim 15 wherein said filter is comprised of a first porous layer for screening particulate matter and a second hydrophobic layer located inboard from said first porous layer for screening water.

17. A vented hubcap end closure device according to Claim 16 wherein said first porous layer is comprised of sintered polypropylene plastic.

18. A vented hubcap end closure device according to Claim 16 wherein said second hydrophobic layer is comprised of a sheet of polytetrafluoroethylene.

19. A vented hubcap end closure device according to Claim 16 further comprised of a third porous layer for screening particulate matter located inboard from said second hydrophobic layer.

20. A vented hubcap end closure device according to Claim 19 wherein said third porous layer is comprised of sintered polypropylene plastic.

21. A vented hubcap end closure device according to Claim 15 further characterized in that said filter is comprised of a substance selected from the group consisting of: high density polyethylene, ultra high molecular weight polyethylene, polypropylene, polytetrafluoroethylene, nylon, polyvinylidene fluoride), and polyethersulfone.

22. A vented hubcap end closure device according to Claim 15 wherein said filter is comprised of a sintered thermoset polymer.

20. A vented hubcap end closure device according to Claim 19 wherein said filter is comprised of a sintered thermoplastic polymer.

24. A vented hubcap end closure device according to Claim 15 wherein said floor of said filter cup is formed with a single, axially centered breather port as aforesaid, and wherein said roof is formed with a plurality of vent openings as aforesaid and a plenum cavity residing in communication with all of said vent openings is defined between said roof and said filter.

25. A vented hubcap closure assembly for closing a wheel end bearing chamber containing a fluid lubricant and located behind a hubcap end wall that has a central axial plug opening therein comprising:

5 a resilient, annular collar inserted into said plug opening and having a radial, outer wall surface that establishes a fluid-tight seal with said hubcap end wall at said central, axial plug opening therein, and a radial inner wall surface having an annular gripping ring defined thereon,

10 an inboard filter cartridge cup having a radial outer annular wall with longitudinal outboard and inboard ends and with a radial outer surface residing in fluid-tight sealed engagement with said radial inner wall of said resilient collar and immobilized from longitudinal movement by said gripping ring, a floor extending across said inboard end of said filter cartridge cup, and a central, axial breather port defined through said filter cartridge cup floor,

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a filter cartridge lid seated in said collar and having an annular rim disposed in fluid-tight sealing engagement throughout with said radial inner wall surface of said annular collar, and a central roof having at least one vent opening therein, and a filter cartridge chamber is formed between said roof of said filter cartridge lid and said floor of said filter cartridge cup, and

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a filtration structure extending entirely across said filter cartridge chamber and held in position by said filter cartridge cup and said filter cartridge lid, wherein said filtration structure permits the free passage of air therethrough and excludes the passage of water and particulate matter.

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26. A vented hubcap closure assembly according to Claim 25 wherein said filtration structure is further comprised of first, second, and third filter layers and said first filter layer is formed of sintered polypropylene and is located outboard from said second layer, and said second layer is formed of a sheet of polytetrafluoroethylene and is located outboard from said third layer and inboard from said first layer, and said third layer is formed of sintered polypropylene.